# MINERvA Status Report

Deborah Harris, Mike Kordosky,
Kevin McFarland, David Schmitz

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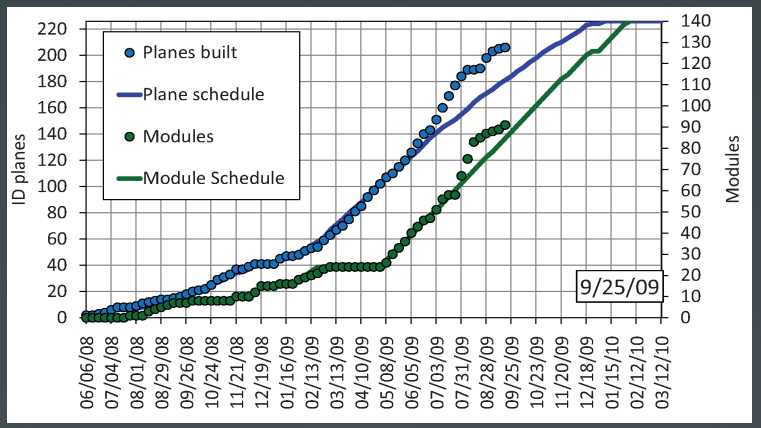
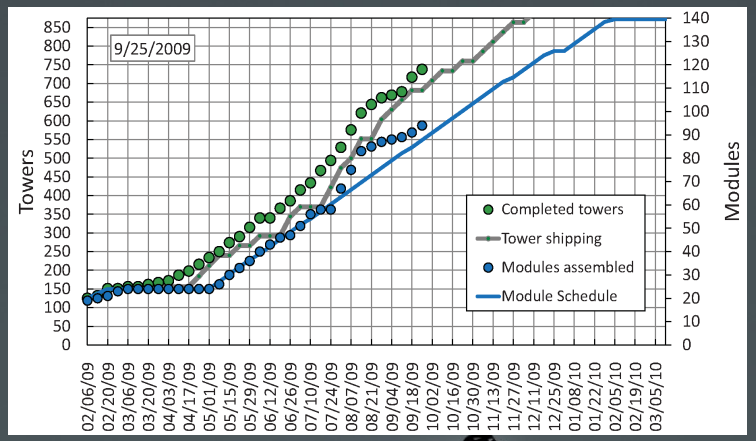
# Outline

- Construction Status
- Installation Status
- PMT Cross-talk Update
- Tracking Prototype Data Processing
- ArgoNeuT Geometry and Simulation

# MINERvA Construction Status

- Scintillator Planes (Projected done 10/30)
  - 14 planes left to finish (206+20 total)
  - Rate limited by WLS fiber delivery
  - Currently project to be done by 10/30
- OD Towers (Projected done early Dec.)
  - 149 towers left to finish (887 total)
  - Baseline rate is 16/week
    - 99% of WLS Fiber for this task is mirrored and at factories
  - Expect to be done by early December
- Steel Frames (Projected done next week)
  - <5 frames left to weld (116 total)



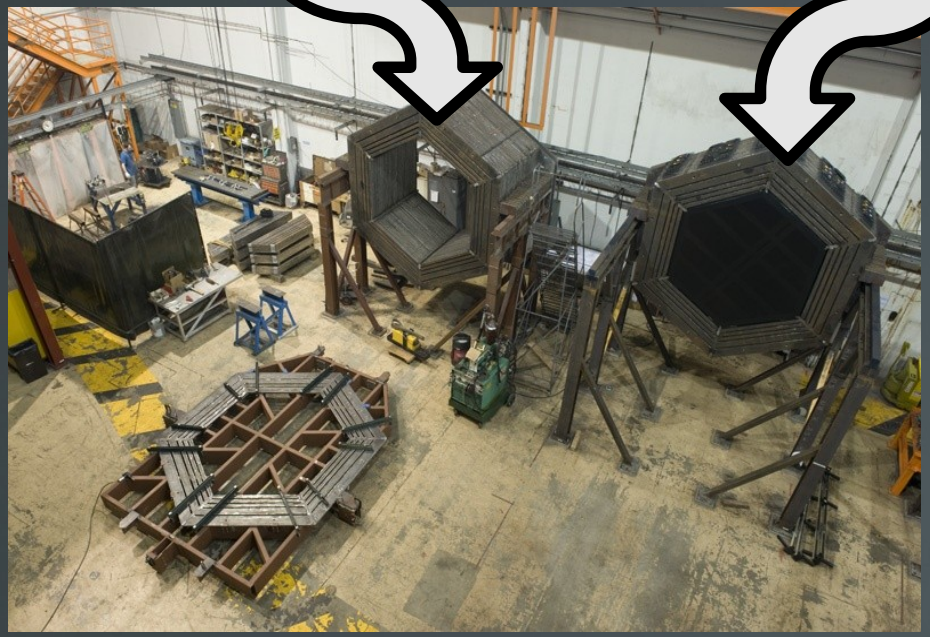



# MINERvA Construction Status

- Module Assembly
  - Have 48 modules left to build as of 9/28
    - Out of 24 TP modules + 116 “final” modules
  - Rate limited by module mapper
  - Have moved folks from plane assembly to module assembly to increase speed during installation
  - Current projection to end January 25, 2010
- Clear Fiber Cable Production
  - Have ~850 cables left to produce (out of ~4200)
  - Rate limited by Lab 7 cutting back connectors
  - Current guess (to be quantified soon) is to finish by end of November

# Where is MINERvA?

- HCAL, ECAL and 10 "Tracking Prototype" Tracker planes are underground
  - Winter install  Remaining fall install (24)



# Fall Installation Status

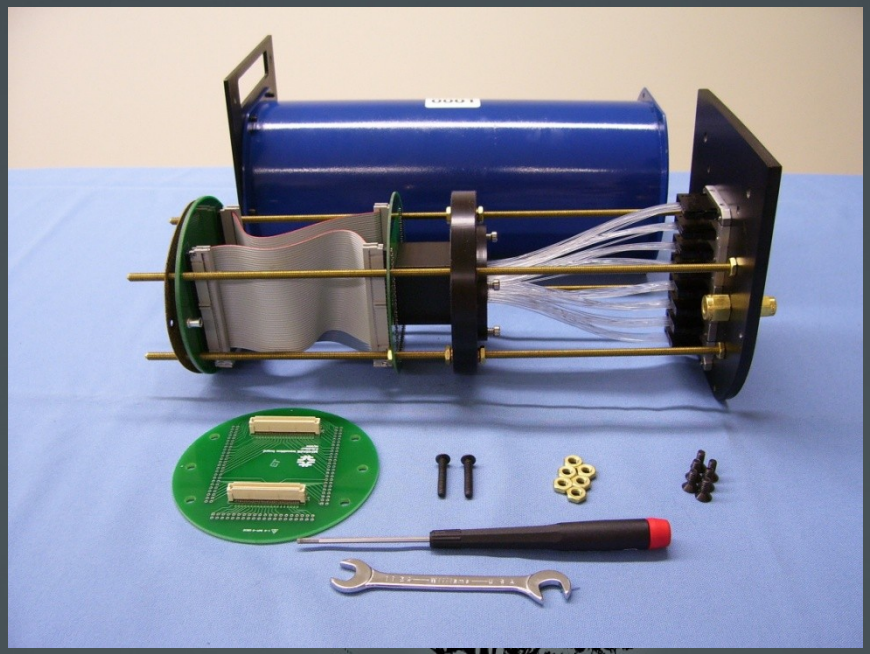
- All modules for fall installation completed
- Unit of installation is “module stack”
  - Four modules that share instrumentation
- Instrumented 6 of 16 module stacks (28 Sept)
  - MS #7 in progress
  - MS #8-10 on stand in near hall

# Fall Installation Status (cont'd)

- Instrumented 6 of 16 module stacks (28 Sept)
  - Tracking Prototype adiabatic rate was 2/week
  - Most likely will choose to install more slowly, at a pace of 1.5/week
    - Test all PMT boxes
    - Give priority to module assembly in resource conflict
    - Don't burn out physicist oversight of installation and module assembly

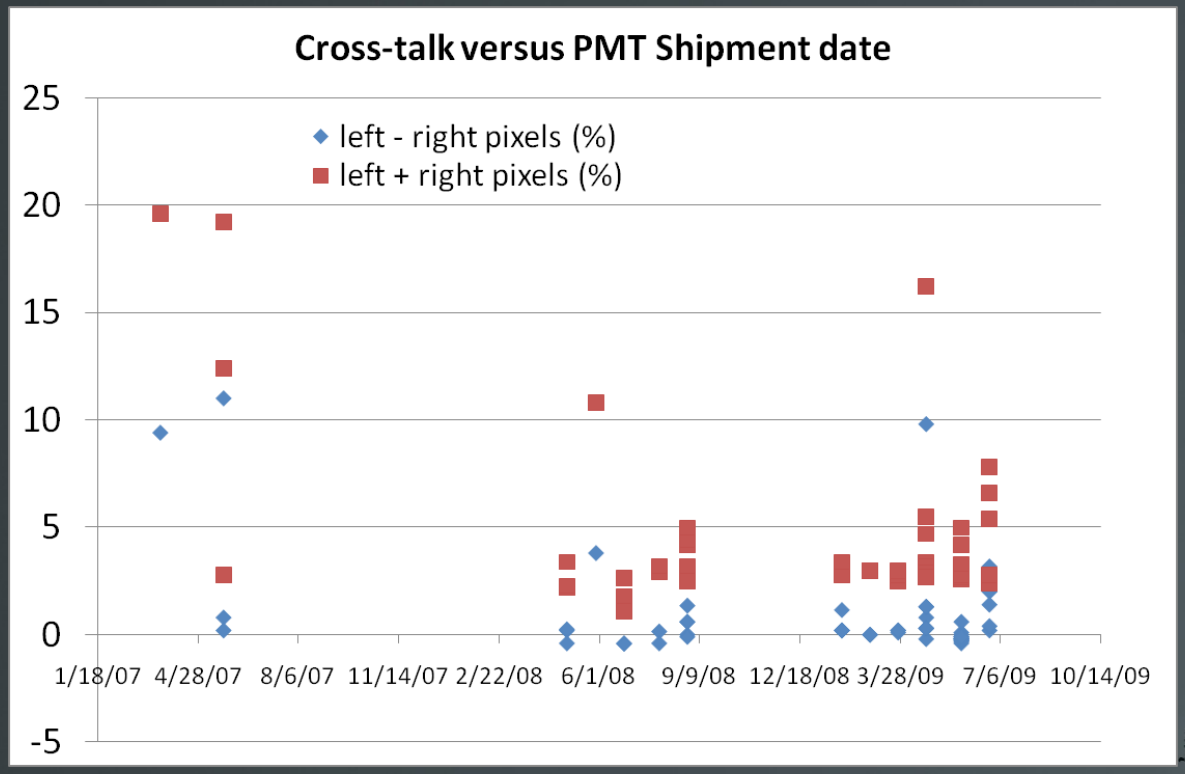
# PMT Box Cross-talk

- After looking at the Tracking Prototype Muon data, we realized that there was high cross-talk in many of the PMT boxes that we had (roughly 20% failed spec)
- Have been investigating the sources of this high cross-talk
  - Misalignment between the cookie holding the fibers and the piece that holds the PMT (most common problem)
  - Misalignment between the PMT and its holder (one example seen so far)



# PMT Box Cross-talk Test

- New requirement that PMT Boxes be tested for cross-talk before installed on detector



# PMT Testing Plan

- Currently testing ~5PMT's per day with setup on 14th floor (including weekends)
- Upgrading to new test facility in Lab F "temporary" clean room where we can test 4 PMT's at a time (to do 16 per day?)
- Tony Mann (Tufts, L2 manager of boxes) has been training Dan Ruggiero (Rochester) on how to repair common misalignment problem
- Need to develop repair and retest plan
- Newer PMT's have lower failure rate than tracking Prototype PMT's (10%, not 20%)

# Tracking Prototype Data Set

- A preliminary complete reconstruction pass of the Tracking Prototype data from the NuMI beam run (April 19-June 15, 2009) has been performed
  - Basic data quality checks performed for each run and spill
  - Detector activity “time-sliced” within each beam spill
  - Pattern recognition filters applied to time-seperated “events”
    - muon entering the front of the detector
    - vertex activity contained in a fiducial volume of 8 tracking modules (neutrino candidate)
      - 16 planes, 87 strips/plane, ~0.5 tons CH

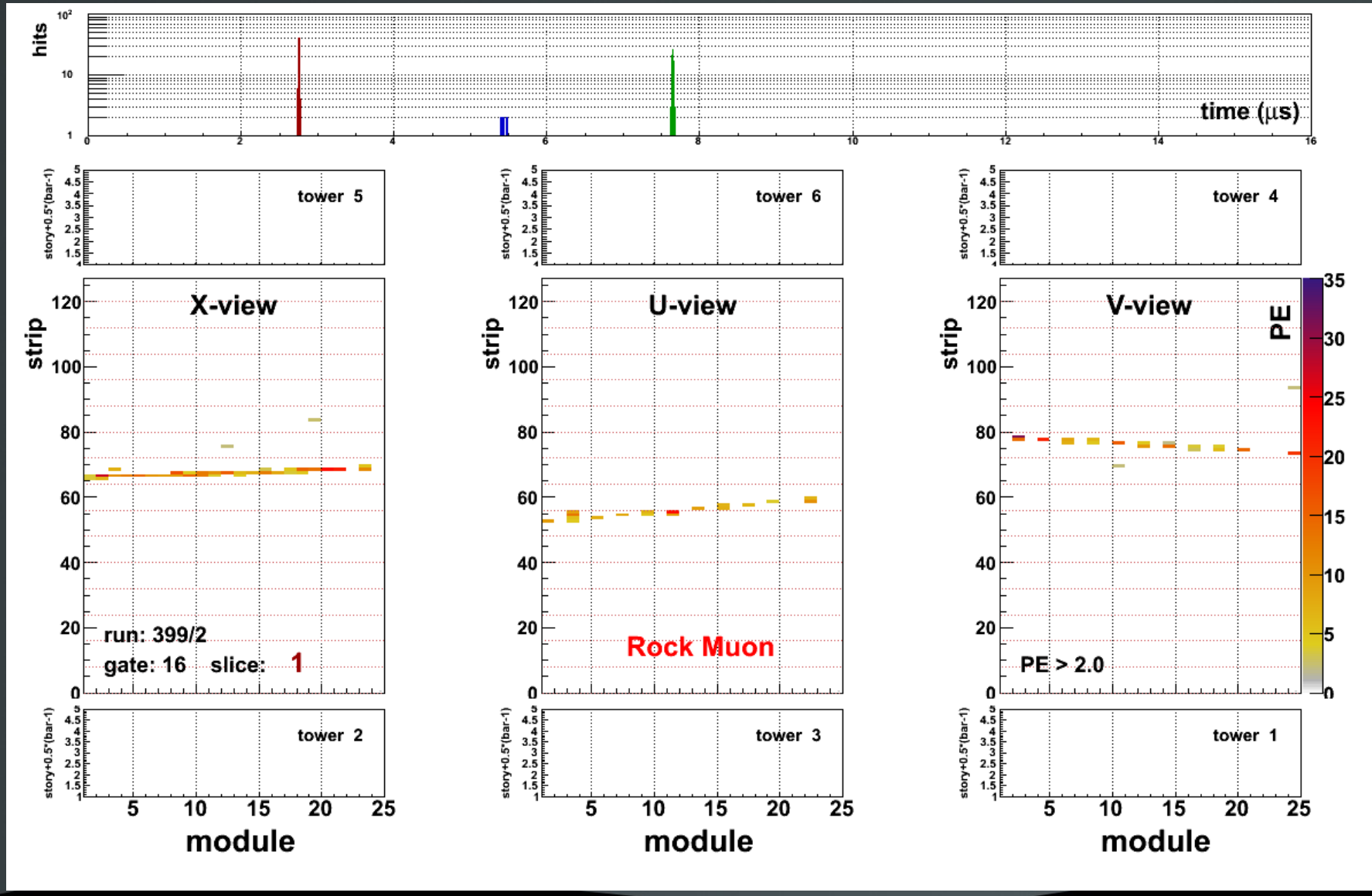
# Tracking Prototype Data Set

- Ran about 80% live!
  - Amazing for first run, esp. since DAQ problems meant we had to stop data taking to acquire pedestals
- Met projections of calculated statistics
  - However, did identify (and fix at end of run) a major readout firmware bug that left some hits with unreadout hits
  - Some data will be recoverable; some not

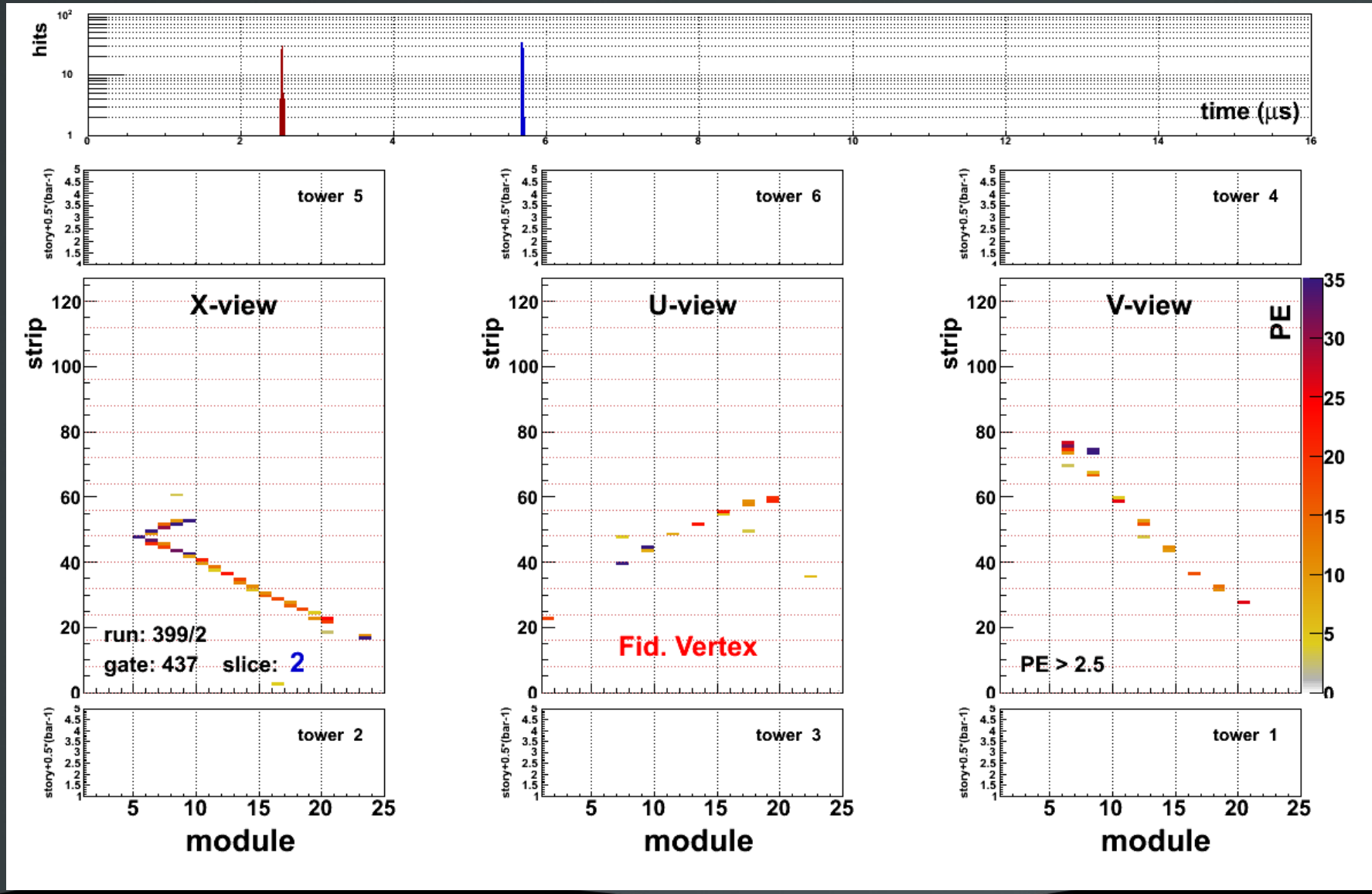
**Preliminary data-based estimate of event statistics in TP run**

| | |
|---|---|
| **NuMI Beam Triggers** | **1.1 M** |
| **NuMI Beam Spills with good proton beam** | **0.8 M (4.3E19 POT/5.3E19 delivered)** |
| **Time-separated detector activity** | **1.95 M** |
| **Front entering muons** | **510 k (380k w/o readout error)** |
| **Vertex activity in fiducial volume (0.5 t)** | **17 k (9k w/o readout error)** |

# Front Entering Muon Event



# Contained Vertex Event



# ArgoNeuT Material Modeling

- Thanks to Brian, Larry, Bonnie, we understand the CAD drawing conversion to GDML geometry
  - This, allows for a GEANT but not ROOT geometry
- Unfortunately, we cannot easily integrate this
  - We use a format (Gaudi XML) well suited to repetitive definition of regular material like MINERvA and MINOS
    - A reasonable choice, given the scenarios we planned for.
  - No automatic converter
  - All options we can conceive of (parameterize ArgoNeuT, insert bare GEANT geometry into our simulation, stand alone ArgoNeuT swimmer) involve significant human intervention/development
  - MINERvA requests assistance with this